Reduction of word final /st/-clusters in monosyllabic and compound nouns in Dutch dialects

Name: Wouter Broos
Student nummer: S0900583
Master Programme: Research Master Linguistics
Specialisation: Theoretical and Cognitive Linguistics
Supervisor: Dr. Yiya Chen
Second Reader: Prof. Dr. Marc van Oostendorp

Table of contents

Reduction of word final /st/-clusters in monosyllabic and compound nouns in Dutch dialects

Wouter Broos

Abstract

Different speech variants can exist of one word, but how much information of these variants is actually stored in the mental lexicon of the speaker? I hypothesise that dialect makes for different reduction patterns in the consonant cluster /st/ and that consequently, phonetic detail of reduced word forms is stored in the mind of the speaker. This was tested by a production experiment in which spontaneous speech and read speech are compared and a perception experiment in which participants had to perform a lexical decision task. Results showed that different dialects indeed show different frequencies and patterns of cluster reduction. Specifically, the Ede dialect reduced and deleted /s/ more frequently than the dialect Roosendaal. Reaction times of the third experiment showed that reduced word forms are not stored next to the canonical form. However, response data revealed that phonetic detail was influential when recognising reduced forms. I propose a hybrid model of the episodic and abstract model of storage of word forms in that phonetic detail of variants is stored next to the canonical form.

Keywords: Speech variants, dialectal influence, storage, word recognition

Introduction

In speech production, not every single phoneme in a word is pronounced all the time. For instance, the Standard Dutch word ‘postzegel’ (‘stamp’) contains the consonant cluster /stz/. Officially, this must be pronounced as [‘pɔstzegəl]. However, due to ease of pronunciation, this is often reduced to the realisation [‘pɔszegəl] or even [‘pɔsegəl]. Since this word can easily be recognised by its form (also in its reduced form), the listener does not need all the phonemes but is perfectly capable of fathoming its meaning when the consonant cluster /sz/ or only the consonant /s/ is pronounced. Yet, some dialects produce different reduced word forms than the forms presented above. But what factors influence the different reduction patterns in these dialects? Furthermore, if different dialects simplify complex clusters in distinct ways, are words then represented and processed differently in these dialects? This article is concerned with three main issues with regard to reduced word forms in general and reduction due to dialect. It will consider several factors that affect the amount of reduction that has been observed in words forms. Moreover, it will focus on the differences in pronunciation due to dialect and whether different reduced word forms arise as a result. Finally, storage of these different word forms in the mental lexicon will be examined.

Production of reduced word forms

Previous research has considerably focused on phonological factors with regard to reduction (Recasens, 2004; Plug, 2011; Aylett & Turk, 2006; Bell et al., 2003, 2009; Gahl, 2008); the placement of a segment in a syllable can determine how much a particular word is reduced. It is widely known that phonemes in onset positions are less likely to be reduced or deleted than phonemes that stand in coda positions. One study that focussed on this aspect looked at the effect of syllable position of consonants in Catalan (Recasens, 2004). The results of this study show that unconstrained consonants (like /n/ or dark /l/ in Catalan) are produced

less front in syllable final position when compared to syllable initial position, lending further support that syllable final reduction in consonants can be conditioned by consonantal production.

Besides phonological correlates, a link between sociolinguistics and reduction was established as well (Van Son, 1999). Overall, there are two main factors that play a role when considering sociolinguistic factors for reduction: speech style (formal vs. informal speech) which zooms into intra-speaker variation and dialectal differences. A study has been done on the comparison of formal and informal speaking style regarding phonetic reduction and the perception of reduced speech (Van Son, 1999). The results indicate that the acoustic correlates which were tested were all significantly lower or less in spontaneous speech when compared to read speech. Thus, speech style does display a dichotomy when it comes to phonetic reduction in that informal speech shows more reduction than formal speech. As for dialectal differences, a study was performed that compared an English dialect with Standard English with regard to /t/ and /d/ deletion/reduction (Bayley, 1995). Results show that even though /t/-/d/ deletion/reduction shows the same pattern in the dialect as in 'standard' English, there was a significant difference between different age groups.

Reduced word form recognition and storage

Just like speech production, much research has also been done on word recognition when sounds are deleted due to assimilation (Mitterer et al., 2006; Ernestus et al., 2002; Scheibman, 2000; Mitterer & Blomert, 2003; Gow & Im, 2004; Gow, 2002; Gaskell & Marslen-Wilson, 1996; Strange et al., 2001). A fascinating element about perception and thus also recognition is the way in which certain sounds and words are perceived if certain phonemes or parts of words are different than the full form of that word. Two main findings have been discovered by research done on this topic.

Firstly, phonetic detail plays a significant role in word recognition. Mitterer & Blomert (2003) showed that Dutch native speakers did recognise words in a context where assimilation is to be expected while this is not done if such a context is not present. For instance, 'tuimbank' (a non-word) is perceived as 'tuinbank' ('garden bench') even though 'tuim' is not a word. Yet, if a word like 'tuimstoel' (the non-word variant of 'garden chair') is presented, listeners do not perceive this as a word. The reason lies in the context of the assimilated word; /b/ in 'tuimbank' affects pronunciation of /n/. This is not the case when /s/ follows since there is no fricative variant of /n/. Thus, phonetic detail plays an important role in the production of certain words which in turn affects the perception of them.

Secondly, segmental context is important when assimilated forms are presented. Japanese listeners, for instance, perceive assimilated American vowels differently depending on the voicing of the following consonant (Strange et al., 2001). Also, Ernestus et al. (2002) hypothesised that there is a correlation between recognition accuracy and phoneme reduction. Consequently, highly reduced forms might not be recognised in isolation. This study shows that both phonemic context and ease of pronunciation can affect the recognition of reduced word forms.

Subsequent to the matter of perception of reduced and assimilated word forms is the storage of these words in the mental lexicon. Sumner & Samuel (2005) have done a study that relates to this topic in which they focus on perception with regard to representations of multiple variants of words in the mental lexicon. In particular, variation of final-/t/ in English is analysed and interpreted by using semantic priming experiments. The data reveal that variants of the canonical form do not hinder lexical access in the short term semantic processing. Long term semantic processing, however, shows that a priming effect is only found for words that follow the canonical form of /t/ meaning that only this form is stored as opposed to its variants. It was conclude that variation may affect short term semantic processing if variation is arbitrary, but that the storage of underlying forms remains the same; the canonical form is stored in contrast to variation, meaning that recognition is optimal when the basic form is perceived.

As described above, an extensive amount of research has been done on the storage of phonological variants in which some experiments focussed on dialectal variation of word recognition (Sumner & Samuel, 2009). More precisely, speakers with different amounts of experience of a dialect were tested in order to see whether storage of these dialectal word forms differed when taking experience into account. The results indicate that experience helps the listener to better understand word forms of that dialect. What has also been found was that dialect production can lead to an addition of phonetic detail with regard to independent phonological representations in the mental lexicon for each dialect separately. Thus, recognition of word forms in a dialect differs according to the amount of experience a speaker has with a certain dialect. I hypothesise that speakers of a dialect that do not pronounce /t/ often or not at all would store different or additional phonetic information that is added to the canonical form of monosyllabic nouns ending in /st/ when compared to speakers of a dialect that does not reduce /t/ at all.

Goal of the Current Study

The main goal of this study is to observe the influence of the factors speech style and dialect with regard to the amount of reduction that is seen in production and perception of reduced word forms. This was observed by means of examining the differences between read and spontaneous speech of several dialects. Moreover, storage of underlying forms and/or phonetic detail was examined as well using a lexical decision task while measuring reaction time and responses.

Experiment 1

Experiment 1 addresses the question of pronunciation variation with regard to monosyllabic and compound nouns in two distinct dialects. Two distinct reading tasks were performed (read vs. spontaneous speech) in order to observe the difference between speech style. I expect to find a categorical difference in the amount of reduction when the target nouns are produced. If these differences are found, storage of the underlying word forms can be examined.

Participants

There were two groups of participants, ranging from 18 to 28 years and each group consisted of 12 participants. The two groups represent two different dialects spoken in the Netherlands: people from the west (Leiden, 11 female / 1 male) and people from the south (Roosendaal, 10 female / 2 male).

Stimuli

Two types of stimuli were made; a list of 72 words that had to be turned into sentences and 7 stories that had to be read. Hence, the first part observed spontaneous speech while the second part focussed on read speech. 20 words in the list contained the cluster /st/ in simple nouns, 20 compound nouns were used, and 32 fillers ending in /s/ or /t/ were presented. Fillers were used so that the participants did not notice that they were being tested for a particular consonant cluster (/st/ in this case) and so that they did not adjust the way they speak. This way, we obtained more reliable data.

The stimuli used in this experiment consisted of one syntactic category: nouns. A main distinction was made when analysing the data: on the one hand, two nouns that form one word (compound noun) in which the first noun ended in /st/ and on the other hand, simple nouns ending in /st/. To examine the dialectal differences, two groups of participants were used. Participants performed exactly the same tasks so that I could objectively measure the different dialectal backgrounds and how these affected their pattern of reduction.

Procedure

The first experiment consisted of two parts, spontaneous and read speech respectively. Participants had to make sentences or stories from 72 words that were presented to them, which took approximately ten to fifteen minutes. During the read speech part, participants had to read 7 short stories out loud. These stories contained all the 72 words from the spontaneous speech part of the experiment. By transcribing the recordings of the read sentences, I obtained read speech. That way, I could compare spontaneous speech and read speech and see how much these two conditions differ.

The data were recorded by means of the audio device ‘M-Audio Microtrack II’. Among the 12 participants, half were born and raised in the Leiden city centre and the other half was born and raised in the surrounding cities of Leiden. Before testing these subjects, the FAND (Fonologische Atlas van Nederlandse Dialecten = Phonological Atlas of Dutch Dialects) was consulted in order to look up the cities where the participants came from and focussed on the pronunciation of nouns that ended in /st/ (both in monosyllabic and compound nouns). /st/ clusters were all pronounced consistently in the areas that the participants came from, meaning that these participants did form a homogeneous group with regard to /st/ cluster production.

Methods

The experiment was performed in a silent room. Participants were asked to make grammatically correct sentences from these words and to produce the sentences as quickly as possible. Silences were allowed in the recording in order to give the participants time to think about the sentences they wanted to say. It was allowed to make semantically incorrect sentences since the only focus of this experiment was pronunciation. As for the read speech part of the experiment, participants were told to read the seven stories slowly and as clear as possible.

Data analysis

The recorded sound files were annotated to text grids in Praat (Boersma & Weenink, 2014). Two interval tiers were made (one for the phonemes /s/ and /t/ and one for the words) and the segments and words were annotated. Afterwards, a Praat script was run in order to calculate the duration of the words and the phonemes /s/ and /t/. These durations were put into excel and percentages were calculated. The percentages that were calculated indicate the presence of the phoneme /s/ or /t/ with regard to the duration of the entire word in order to give a clear overview of the length of /s/ or /t/ in a word. For example, /s/ is 25%, meaning that /s/ takes exactly ¼ of a word when it comes to duration.

Results

Speech style

Repeated Measures by subject show that the factor speech style was significant; *reading task* ($F(1, 24) = 4.880$; $p = .049$) was significant with regard to /t/ in the final consonant cluster /st/. There was also an interaction effect between *reading task* and *word structure* ($F(1, 24) = 7.838$; $p = .017$) for /s/ indicating that compound nouns are pronounced with more reduction in spontaneous speech. Another interaction effect was found, this time for /t/ between *dialect* and *reading task* ($F(1, 24) = 7.598$; $p = .019$) and *reading task* and *word structure* ($F(1, 24) = 17.242$; $p = .002$) indicating that the mean duration of /t/ differs for speakers from different dialect in connection with the reading task, while the reading task significantly differs for monosyllabic and compound nouns. Aggregation by word showed that *reading task* and *word structure* displayed an interaction effect in case of /t/ ($F(1, 72) = 8.687$; $p = .008$).

Dialect

Repeated Measures analyses were also performed in order to observe whether differences in pronunciation exist because of dialect. In case of aggregation by word, *dialect* was strongly significant with regard to /s/ ($F(1, 72) = 9.660$; $p = .006$) meaning that s-reduction is noticeably larger in the west than in the south. There was also an interaction effect when aggregated by word in case of /s/: *dialect* and *word structure* ($F(1, 72) = 13.425$; $p = .002$) indicating a correlation between the pronunciation of the two types of nouns and the dialect in that /s/ is more reduced in the west than the south. As for t-reduction, *dialect* and *reading task* ($F(1, 72) = 11.348$; $p = .003$) showed an interaction effect.

Word structure

Both /s/ and /t/ were significant in Repeated Measures analyses by subject with regard to *word structure:* ($F(1, 24) = 789.996$; $p < .001$) in case of /s/ and ($F(1, 24) = 1333.062$; $p < .001$) in case of /t/. This means that the mean duration of /s/ and /t/ differed significantly per speaker with regard to the type of noun that was read and the task that was done. This factor was also significant when aggregated by word in case of /s/ ($F(1, 72) = 353.238$; $p < .001$) and in case of /t/ ($F(1, 72) = 400.863$; $p < .001$).

Discussion

The role of speech style on reduction processes

In the present study, two different speech styles have been tested with regard to reduction: spontaneous speech (informal speech) and read speech (formal speech). A gradient reduction pattern has been observed since the only sound in the /st/-cluster that is reduced is /s/ in that spontaneous speech shows a lower mean duration compared to read speech in the Leiden dialect; /t/ is mostly reduced instead of completely dropped, meaning that a categorical reduction pattern is not seen. The mean duration of /t/ is not affected by speech style. Moreover, within-subject calculations revealed that this is also true when the overall mean per subject is measured. This is also seen in Van Son (1999) who convincingly argued that informal speech shows more reduction on every phonetic front than formal speech when it comes to content words. What must be mentioned is that Van Son (1999) focussed on monophthongs, meaning that clusters were not investigated. This study has shown that the /st/ consonant cluster is reduced, but in such a way that the initial sound of the cluster is significantly shortened while the final sound is not when informal speech is concerned.

Finally, speech style has an interactional effect with word structure in that compound nouns are more often reduced in spontaneous speech than in read speech. The reason for less reduction in monosyllabic nouns is relatively straightforward; the cluster /st/ in compound nouns stands in the coda position of the first noun, while the second word almost always follows with a consonant. Monosyllabic words are mostly followed by pauses and/or vowels, leading (in the latter case) to resyllabification, which in turn means that the final /t/ becomes the onset of the following word (Recasens, 2004; Plug, 2011; Aylett & Turk, 2006; Bell et al., 2003, 2009; Gahl, 2008). The fact that spontaneous speech deletes more than read speech makes sense as well since speakers monitor spontaneous speech less and speak faster. Thus, speech style has a large influence on the amount of reduction and is correlated with word structure.

The role of dialect on reduction processes

A dialectal difference is found with regard to the amount of reduction of the sound /s/. This finding is not consistent with that of De Vries et al. (1974) in which it is argued that people from Leiden frequently delete and/or reduce /t/. A possible explanation might be related to the fact that this study focusses on all syntactic categories, mostly on verbs. A scheme made by Goeman (1999) shows that the syntactic category ‘nominals’ (nouns, irregular superlatives,

adjectives, and numerals) only delete/reduce word-final /t/ in /st/ clusters in around 10 percent of the cases. Thus, the syntactic category does matter when focussing on reduction patterns and mean duration of /t/. Still, this does not explain why /s/ is significantly reduced instead of /t/. The only explanation for this is that these studies were performed between 40 and 15 years ago, meaning that the realisation of /st/-clusters could have changed during the years. What can be stated is that /s/ is reduced more often in the Leiden dialect than the dialect of Roosendaal which indicates that dialect most definitely matters when observing reduction patterns in Dutch.

The above findings show that people who speak the dialect of Roosendaal and the dialect of Leiden treat the /st/ cluster differently when it comes to its pronunciation. However, the differences between the two dialects was not as categorical as I hoped, meaning that it would be more challenging to set up the perception experiment in order to see whether different forms of final /st/ cluster words are indeed stored; the difference in pronunciation seems too gradient since the realisation of /t/ does not truly differ between the dialects while the difference of the pronunciation of /s/ is not strongly significant. Therefore, another dialect was tested in order to establish a more rigid and categorical difference in pronunciation. Hence, a second production experiment was performed, this time on speakers of the dialect of Ede and surrounding areas.

Experiment 2

In experiment 2, nouns ending in /st/ which were followed by consonants were pronounced by speakers of Roosendaal and Ede in order to establish more distinct dialectal differences in cluster simplification. Speakers of the dialect Ede are hypothesised to delete much more when compared to speakers of Roosendaal regardless of what consonant follows. Therefore, more distinct reduced word forms are expected to surface.

Participants

Sixteen participants were tested in total; eight participants who were born and raised in Ede (5 female / 3 male) and another eight participants who were born and raised in Roosendaal (6 female / 2 male). Both participant groups had the same age range; between 18 and 35 years of age. All of the participants in the group Roosendaal spoke the Roosendaal dialect, while all the participants in the group Ede spoke their Ede dialect.

Stimuli

In order to obtain a clear picture of the reduction process if consonants follow, the stimuli were slightly adjusted when compared to the stimuli of the first experiment. This was done so that situations were created where /t/ is likely to delete. This means that the dialect of Roosendaal is put to the test to see if speakers still maintain /t/ if a consonant follows or at least when consonants follow that are known to make /t/ reduce or delete. Participants had to pronounce a phrase that contained monosyllabic nouns that ended in the consonant cluster /st/. These phrases were constructed in such a way that every target noun was followed by a word

that began with a consonant. Fillers were used as well in order to avoid detection of the goal of the experiment so that participants could not adjust their speech accordingly.

The stimuli were different from that of experiment 1; it consisted of phrases that were constructed of two words; the first word (if a target word) was a monosyllabic noun that ended in the consonant cluster /st/ which was followed by another word that began with a consonant. This second word belonged to the syntactic category preposition, verb, or another noun. The first word of the phrase with regard to the fillers that were used did not end in /st/ while the second word did not necessarily have to begin with a consonant. A possible construction was 'angst vanwege' (fear because of) in which the target word 'angst' ends in /st/ while the second word 'vanwege' began with a consonant. A filler was, for instance, 'kaars aan' (candle on) where the first word 'kaars' is a filler and ends in /s/ while the second word 'aan' starts with a vowel. 65 target words were included while 45 fillers were used. Thus, 110 phrases were presented to each participant in total.

Procedure

The task the participants had to perform was similar to the spontaneous speech part of the first experiment with some minor differences. The participants were asked to read the phrases that were presented to them. Before the participants started speaking, people from Roosendaal were asked to read out the words in the dialect of Roosendaal, while the other group from Ede and surrounding areas was asked to read out the words in their dialect.

Methods

The participants were recorded with the audio device 'TASCAM DR-07 MKII'. They were recorded in a silent room in order to minimize distracting noise. The task was very similar to that of the spontaneous speech part of the first experiment; participants saw 110 phrases which they had to pronounce in their dialect. Silences in the recoding were allowed since only read speech was listened to. After the data was collected, it was analysed and segmented by means of the computer program Praat (Boersma & Weenink, 2014). The recordings were annotated in text grids in order to separate the /s/ and /t/ from the /st/ cluster. The duration of /s/ and /t/ was again put into percentages in order to objectively measure the amount of time of this particular sound and how much of the word was made up of this sound. Another factor with regard to t-deletion was tested as well; the duration of /s/ in relation to the deletion of /t/. The influence of this factor was tested by a univariate analysis and a comparison of means of s percentage.

Data analysis

A univariate analysis was conducted in order to determine the impact of *dialect* (Ede vs. Roosendaal) so that it could be established whether the consonant cluster /st/ is significantly more reduced in one dialect compared to another. The duration of the entire word that was pronounced was calculated, as well as the duration of the sound /s/ and the sound /t/. Subsequently, the percentage of /s/ and /t/ were calculated by dividing the duration of the

sounds /s/ and /t/ by the duration of the entire word. This way, the amount of reduction per sound was objectively compared.

Results and discussion

Univariate analyses: dialect

A strong significant effect of *dialect* ($F(1, 1022) = 78.399$; $p < .001$) was seen, indicating that /s/ is reduced less in Ede than in Roosendaal since the mean duration in percentages of /s/ in Ede is .35 while this is .30 in Roosendaal. This seems contrary to what would be expected, but it seems that /s/ is longer in duration where the /t/ is deleted. A strongly significant effect of *dialect* ($F(1, 1022) = 736.293$; $p < .001$) has been observed for /t/ as well, which means that speakers of the dialect Ede delete and reduce /t/ more often than speakers of the dialect Roosendaal since the mean duration percentage of /t/ in the /st/ cluster is .05 while this amounts to .16 in Roosendaal. Hence, the hypothesis that /st/ clusters in coda position in monosyllabic nouns is more often reduced by speakers of Ede than speakers of Roosendaal is confirmed for the final phoneme in the consonant cluster /st/.

Repeated Measures: dialect

Repeated Measures analyses were performed and strongly significant effects were found. The only factor that could be tested was *dialect* ($F(1, 16) = 16.835$; $p = .005$) which reconfirms the finding that speakers of Ede have significantly longer /s/ durations than speakers of Roosendaal and that dialect is significant when it comes to the pronunciation of /s/ in the consonant cluster /st/. The same grouping by subject was done for /t/. The factor *dialect* was strongly significant ($F(1, 16) = 69.290$; $p < .001$) in that /t/ was more often reduced or deleted in Ede than in Roosendaal.

A strong significant effect by word for *dialect* ($F(1, 64) = 120.499$; $p < .001$) was found for the pronunciation of /s/ which indicates that when the data is grouped per word, mean duration percentage of /s/ is noticeably larger in Ede than in Roosendaal. When focussing on /t/, a significant effect of *dialect* ($F(1, 64) = 562.002$; $p < .001$) is found once again; this time, as is also seen in the univariate analyses above, /t/ percentage regarding mean duration is lower for speakers of Ede when compared to speakers of Roosendaal. Results show that dialect is strongly significant when it comes to the pronunciation of the cluster /st/, even though one component is considerably higher in the dialect Ede (mean duration percentage of /s/) while the other component is substantially lower (mean duration of /t/) when compared to the dialect Roosendaal.

During this particular experiment, the main focus of dialect has shifted from Leidens to Edes, the latter being a dialect that does delete. More specifically, the pronunciation of monosyllabic nouns ending in the consonant cluster /st/ has been recorded and transcribed. The central goal of this experiment was to prove that this cluster is indeed pronounced differently in the dialect of Ede and Roosendaal, which has been proven by univariate and Repeated Measures analyses.

A strongly significant effect was found with regard to the factor dialect. It has been shown that the mean duration percentage of /s/ of the cluster /st/ in Edes was significantly higher than in Roosendaals, while /t/ was considerably lower in this cluster in Edes. These findings are consistent with Goeman (1999) and DeVries (1984) concerning the fact that /t/ is more often deleted in areas around the river area in the Netherlands than in areas to the south and north of the country. Another finding that matched the findings of Goeman (1999) and DeVries (1984) concerns the amount of deletion that is seen: I found exactly as much deletion in monosyllabic nouns when another consonant followed at the onset position of the following word, 61.1% exactly, as opposed to 62% that Goeman (1999) found. Therefore, the amount of deletion in the cluster /st/ has not changed in the river area of the Netherlands.

t-deletion and s-duration

As mentioned above, /t/ is more often reduced in Ede than in Roosendaal and yet, /s/ is longer in duration in Ede. This gives rise to the question; is /s/ prolonged with the amount of time that /t/ would otherwise have taken up? In order to answer this, Repeated Measures by subject and by word were performed. A new dependent factor '*deletion of /t/*' is used to calculate this, which denotes circumstances where /t/ is reduced and where it is not. What will be measured is the duration of /s/ in words where /t/ is deleted and where it is not deleted. Results of Repeated Measures by word showed that the factor *deletion of /t/* ($F(1, 120) = 20.864$; $p < .001$) is strongly significant in that the final consonant cluster /st/ in words without /t/ have a longer duration of /s/ when compared to words that do have the /t/ still present. It is safe to assume that the hypothesis that /s/ is longer when /t/ is deleted is confirmed and that /t/ truly is frequently deleted instead of just being reduced in the dialect Ede.[1]

The above analyses have shown that dialect did turn out to be a very powerful factor that influences the amount of reduction. Now that a more categorical difference is found between the dialects of Ede and Roosendaal, storage of phonetic detail and reduced word forms can be examined. This is done in experiment 3 by means of a lexical decision task.

Experiment 3

People from Roosendaal and people from Ede and surrounding areas were tested by means of a lexical decision task. It is hypothesized that people from Ede would categorize the reduced words as existing words since they frequently pronounce words ending in /st/ without /t/. Hence, these words might be stored differently in the mental lexicon as well due to the fact that they pronounce these words differently. People from Roosendaal, however, would not recognize reduced words as existing ones since they do not delete /t/ in a /st/-cluster. Consequently, they would not store the reduced versions of these words and would also not categorize these as existing words. The question whether several reduced word forms are indeed stored is answered.

[1] In order to determine whether /s/ is pronounced in the same manner as when there is originally no /t/ present at all, one has to look at s-duration of words ending in /s/ and compare these means with s-duration in words that end in /st/ duration where /t/ is deleted. Yet, to research this would go beyond the scope of this article. Ultimately, it can be stated that /s/ is longer if /t/ is deleted.

Participants

24 participants of the same population were tested in total; 12 were born and raised in Ede (8 female / 4 male) while the other half was born and raised in Roosendaal (8 female / 4 male). Two age groups can be distinguished: one younger group of participants between 20 and 30 years of age and one older group of participants between 45 and 55 years of age. This was done in order to take the factor age into account; younger people tend to react faster to the stimuli than older people.

Stimuli

Participants were presented with 80 words; 20 real words, 20 reduced words, and 40 non-words acting as fillers. Two versions of this experiment were made in order to counterbalance the data. A total of 40 existing Dutch monosyllabic nouns were used and half of these words were reduced for one version. In the other version, the other half of the words was reduced, meaning that each word was only presented once while the target words and reduced words were used in complementary distribution. This was done in order to avoid lexical priming and repetition effects.

The words were read by a speaker of Ede in order to observe whether there is an effect of dialect when it comes to pronunciation. Also, the reduced words (words minus /t/) were most important in this respect since people from Ede are hypothesised to recognise these words as existing words. The fact that words in /st/ are pronounced as reduced words indicates that this might indeed be the case. The fillers were constructed in such a manner that they never end in /s/ or /t/. They were also monosyllabic like the target words and reduced words and contained approximately the same phonemic make up; one consonant or consonant cluster in the onset, a monophthong or diphthong in the nucleus, and one consonant or consonant cluster in the coda.

Procedure

In this experiment, participants had to perform a lexical decision task; words were presented via a headphone by means of the computer program E-prime and participants had to decide whether the word that is heard exists in Dutch or not. Reaction times and correct responses were measured while age of the participants was taken into account.

Methods

The participants were tested in a silent room while they were presented with words through a headphone by means of the computer program E-prime. A practice trial was presented first in which they heard four stimuli that did not count with regard to the results of the real experiment. After the practice trial, the real experiment began. Half of the participants were told to press the ‘m’ button on the keyboard if the word existed in Dutch and to press ‘z’ when it did not. The other half of the participants were told the opposite (to press ‘z’ when it does exist and ‘m’ when it does not) in order to take the variable handedness into account. There was a pause in the middle of the experiment (after 40 stimuli were presented).

The data was interpreted by means of 'E-data Aid', a program that is part of the computer program E-prime. Outliers in the data were eliminated before Repeated Measures analyses were conducted; all reaction times in the perception stimuli that exceeded 5000 ms were excluded from the analysis (26 stimuli out of 1920 (1.35%)) as well as stimuli that were frequently misheard (7 out of 40 reduced words (8.75%) leading up to a total of 10%). After necessary deletions, Repeated Measures analyses were performed by word and by subject. Responses were interpreted as either 'right' or 'wrong'. The fillers and reduced words did not exist and had to be judged as 'wrong' by the participants while the words do exist in which case participants had to decide that it was 'right'.

Data analysis

Two main word groups can be distinguished: words and reduced words. Moreover, two main age groups are observed: younger (20 to 30 years of age) and older speakers (45 to 55 years of age). Finally, two main data groups can be formed for reaction times and responses. Response data is discussed first after which reaction time data is observed. Before significant results are discussed, some descriptive statistics are given in order to give a clear overview of the interactions and relations between the different groups that were tested.

Results and discussion

Responses

Table 1 shows the mean percentage of responses that were correct as aggregated by word.

Table 1
Mean percentage of correct responses for data obtained in experiment 3 (*p < .005).

Age Group	**Word Group**	**Mean response Roosendaal**	**Mean response Ede**
Younger (20 to 30)	*Words*	.9583	.9750
	Reduced words	.8284*	.4118*
Older (45 to 55)	*Words*	.9833	.9500
	Reduced words	.6875	.5000

As can be seen from table 1, the category *reduced words* ($F(1, 32) = 33.959$; $p < .001$) is strongly significant when comparing responses of participants from Ede and Roosendaal in which people from Ede are much less accurate than people from Roosendaal leading up to a difference of 41.66%. The category *words* ($F(1, 80) = .358$; $p = .553$) does not show significance. As for the older participants, no significant effects were found. The category *words* ($F(1, 80) = .717$; $p = .408$) or *reduced words* ($F(1, 32) = 4.483$; $p = .051$) were not significant. Figure 1 shows the mean percentage of correct responses of all categories and all age groups.

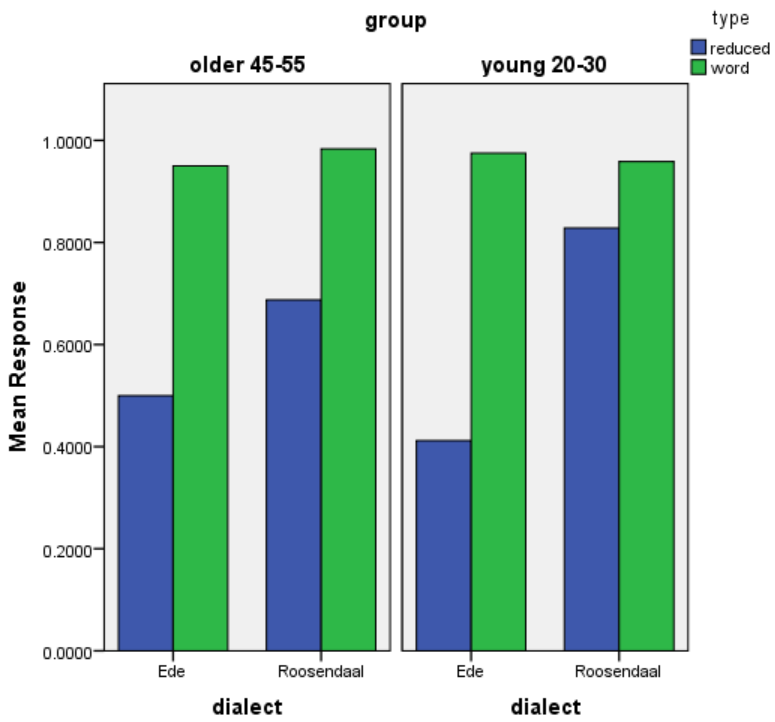

Fig. 1. Mean percentages of correct responses of speakers of dialects, the three word types, and both age groups in experiment 3.

Results of correct responses reveals that the younger group of Ede treats reduced words significantly different than the group of Roosendaal; the former is less accurate in responding to reduced words than the latter group. In the category *reduced words*, participants were correct in saying that these words did not exist (in which case they received 1 point) and incorrect when they claimed the words to exist (which is when they got 0 points). Thus, the lower the accuracy score, the more often participants perceive the reduced words as existing words. This proves that reduced word forms are more often recognised as words by speakers of Ede. No significant results were found for the older group in the category *reduced words*, even though a large difference is seen in mean percentages of correct responses. The above findings show that one does not have to speak the dialect in order to recognise reduced words as words since the significant effect was found in the younger age group, a group that does not speak Ede.

Table 2 shows the mean percentage of responses that were correct as aggregated by subject.

Table 2
Mean percentage of correct responses for data obtained in experiment 3.

Age Group	**Word Group**	**Mean response Roosendaal**	**Mean response Ede**
Younger (20 to 30)	*Words*	.9583	.9500
	Reduced words	.8256	.6465
Older (45 to 55)	*Words*	.9500	.9098
	Reduced words	.7569	.4598

As can be seen from table 2, not a single category is significant. The categories *words* (F(1, 12) = .040; p = .849) and *reduced words* (F(1, 12) = 2.716; p = .160) of the younger age group do not show significance. Significant effects in the older speakers are absent as well; *words* (F(1, 4) = 1; p = .500) and *reduced words* (F(1, 4) = 1.604; p = .426) do not yield significant effects. Mean duration does give an indication of what is expected; the mean percentages of correct responses of the category *words* does not differ as much between speakers from Ede and Roosendaal as the category *reduced words.* The above data are shown in figure 2.

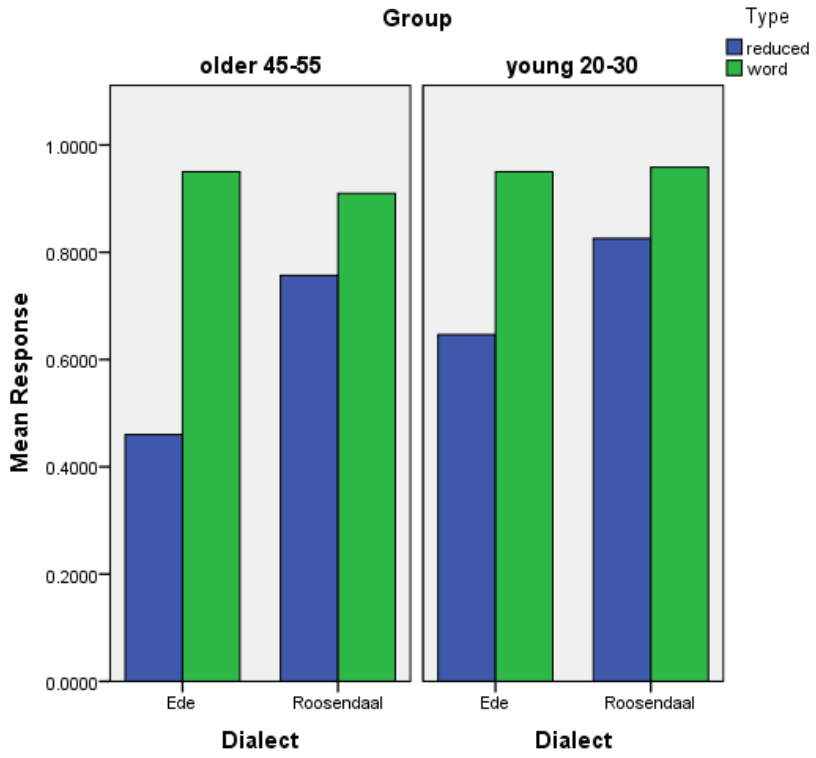

Fig. 2. Mean percentage of correct responses of speakers of dialects, the three word types, and both age groups in experiment 3.

Reaction time

Table 3 shows the mean reaction times in milliseconds of speakers of Ede and speakers of Roosendaal as aggregated by word.

Table 3
Mean reaction times for data obtained in experiment 3.

Age Group	Word Group	Mean Reaction Time Roosendaal	Mean Reaction Time Ede
Younger (20 to 30)	*Words*	1228.6583	1280.8750
	Reduced words	1857.5196	1862.9471
Older (45 to 55)	*Words*	1320.5500	1408.1500
	Reduced words	1806.0625	1897.8125

The above table shows that there were no significant results with regard to reaction times when it comes to the categories words and reduced words; *reduced words* (F(1, 32) = .611; p = .447) did not yield statistically significant results and neither did the category *words* (F(1, 80) = 1.136; p = .300). The data in table 3 above are shown in figure 3 below.

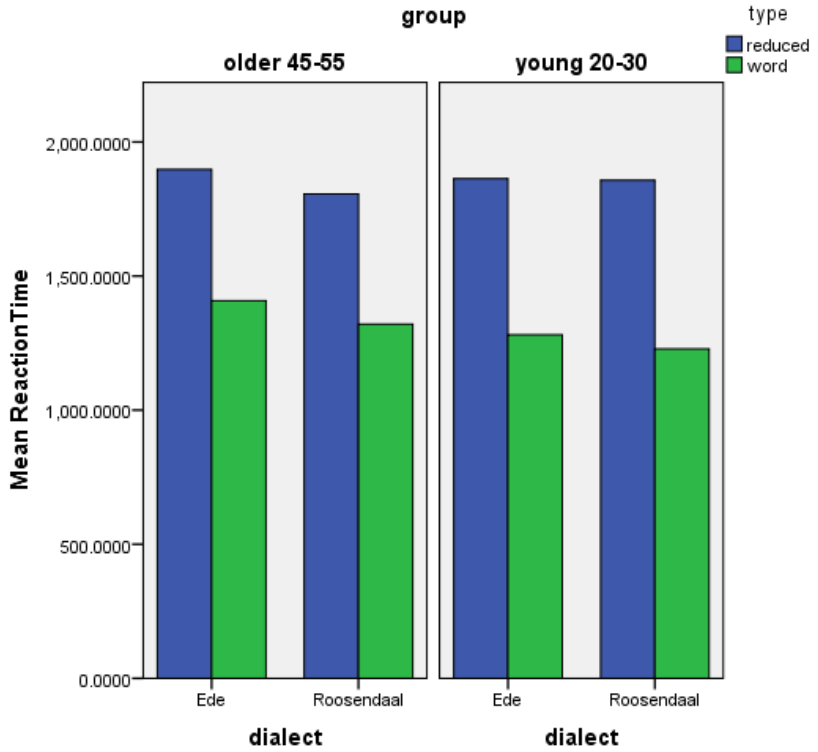

Fig. 3. Mean reaction times of speakers of dialects, the three word types, and both age groups in experiment 3.

Table 4 shows the mean reaction times in milliseconds for aggregation by subject.

Table 4
Mean reaction time for data obtained in experiment 3.

Age Group	**Word Group**	**Mean Reaction Time Roosendaal**	**Mean Reaction Time Ede**
Younger (20 to 30)	*Words*	1468.9765	1149.6402
	Reduced words	1893.0693	1991.5004
Older (45 to 55)	*Words*	1242.9250	1408.1500
	Reduced words	1545.9132	1924.1652

As was the case for the response data, no significant differences are found here either. None of the categories of the younger age group yielded significant results: *words* (F(1, 12) = .000; p = .996) and *reduced words* (F(1, 12) = .005; p = .809). The same holds true for the older age group since their categories *words* (F(1, 4) = .742; p = .547) and *reduced words* (F(1, 4) = 15.206; p = .160) were not significant. Still, when looking at the reaction time data, it can be observed that the category *words* is lower in both age groups when compared to *reduced words.* This is in line with what is written about t-deletion and reaction times in the literature (Baayen & Milin, 2010; Mitterer & Ernestus, 2006). Finally, figure 4 shows the mean duration of reaction time.

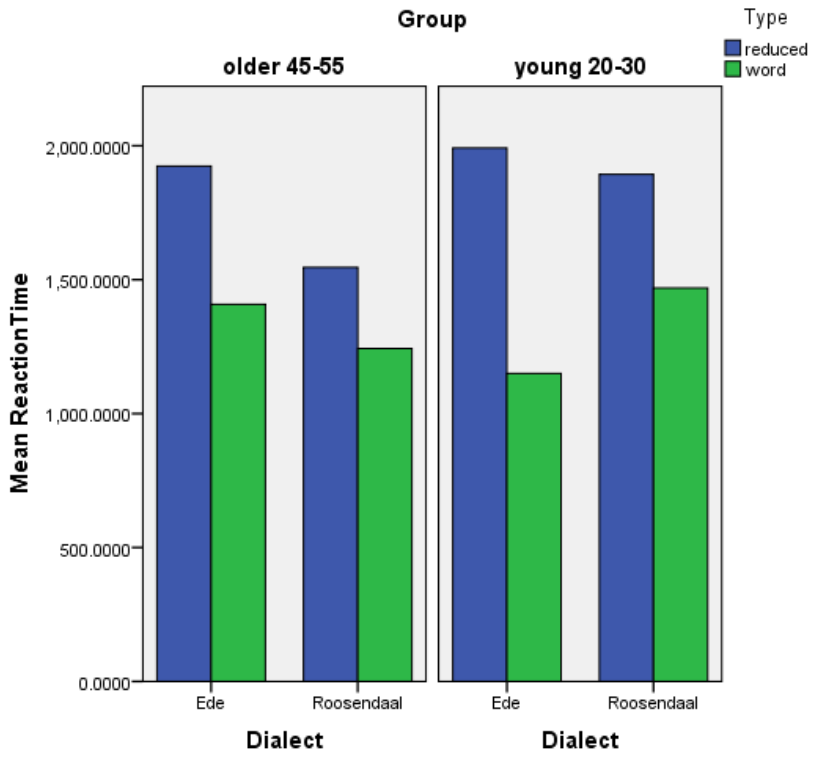

Fig. 4. Mean reaction time of speakers of dialects, the three word types, and both age groups in experiment 3.

Aggregation by subject did not yield any significant results in either younger or older age group regarding reaction times and percentages of correct responses. Furthermore, a large difference is observable in the category *reduced words* between Ede and Roosendaal when considering mean percentages of correct responses. Moreover, the pattern that was seen in reaction time data of Repeated Measures analyses by word can also be seen in the data of subject aggregated analyses.

Overall, words are reacted to less slowly than reduced words, which is true for both dialects. This implies that the reduced word forms are not stored as a word in the mental lexicon of either speakers of Ede or speakers of Roosendaal; people from Ede do not recognise reduced word forms as words, even though they hear and pronounce these reduced words more often than people from Roosendaal. Another finding that is worth mentioning is that every person of the older age group spoke the dialect while nobody in the younger age group spoke it. So, there is a group that both hears and produces reduced word forms frequently (older age group) and a group that only hears it frequently (younger age group). Both age groups have a similar reaction time when it comes to reduced word forms meaning that it does not matter whether you only hear reduced words or also produce them; reduced word forms are just not stored as words. If they were, then reaction times of reduced word forms would lie closer to that of the category *words*.

In sum, the current experiment showed that reduced words were processed differently by speakers of Ede since they recognised it as words considerably more often than speakers of Roosendaal. Response data show that there is a substantial but not always significant difference between reduced words of Ede and Roosendaal. Also, a clear pattern can be seen in the reaction data since reduced words are reacted to slower than words in all age groups and both dialects.

General discussion

The purpose of this study was threefold. Firstly, to observe the influence of the factors speech style and dialect with regard to the amount of reduction that is seen in production of reduced word forms. Secondly, to show that the speakers of the dialect that reduce/delete /t/ perceive reduced words differently than speakers of a dialect that does not reduce when confronted with the reduced forms. Thirdly, to observe the underlying word forms of monosyllabic nouns and to see whether reduced word forms are stored in the mental lexicon of speakers that do delete/reduce /t/.

Overall, three main findings have been observed: 1) speakers of the dialect Ede significantly reduce more than speakers from Roosendaal in the same circumstances, meaning that dialectal differences are found 2) the factors speech style and dialect play a crucial role in the amount of reduction that is applied during speech 3) the reduced word forms of people from Ede are not stored in the mental lexicon even though they recognised reduced words as words significantly more often than speakers of Roosendaal.

Many studies have focussed on reduction, either through production or through perception and storage of underlying forms (Cheng, 2012; van Bergem, 1993; Recasens, 2004; Gahl, 2008; Plug, 2011; Aylett & Turk, 2006; Bayley, 1995; Bell et al. 2003; Sumner & Samuel, 2005; Jurafsky et al., 2001; Scheibman, 2000; Mitterer & Blomert, 2003; Gow & Im, 2004; Gow, 2002; Gaskell & Marslen-Wilson, 1996; Strange et al., 2001; Van Son, 1999; Ernestus et al., 2002; Frauenfelder et al., 2001). Reduction in the production of words can have multiple causes; phonetic, phonological, semantic, and/or sociolinguistics reasons. Within this research field, a dichotomy is seen between research on phonological regular variation on the one hand and mispronounced word forms on the other. There is, however, one important difference with my particular experiments and the ones done by others with regard to speech variation; I used stimuli where an entire phoneme was cut off the words instead of focussing on several possible pronunciations of that phoneme as is, for instance, done with assimilation research. Also, the above studies focussed on issues and phenomena in the standard language while I are mainly interested in the difference between dialects.

In the production experiments, I first tried to establish a difference in pronunciation of the consonant cluster /st/ in monosyllabic and compound nouns with regard to two distinct dialects (Roosendaals and Leids). Also, spontaneous speech and read speech were compared. Results show that speech style does differ when looking at the pronunciation and duration of /s/ and /t/ in the /st/ cluster. However, a dialectal difference was not found since /t/ duration was not significantly different. The duration of /s/ in the cluster was significant, but the effect was not categorical, meaning that another dialect had to be found that truly does significantly delete/reduce /t/ with regard to the particular cluster that is being tested.

The second production experiment compared the dialects Roosendaals and Edes. According to the results, pronunciation and duration of both /s/ and /t/ differed significantly between the two tested dialects. /s/ was substantially longer in duration while /t/ was considerably shorter in duration in Edes than Roosendaals. It was expected that both elements of the /st/ cluster would be shorter in Edes than Roosendaals which did not turn out to be the case. The explanation for this pattern lies in duration: /s/ is longer in duration when /t/ is deleted. This finding is consistent with that of Mitterer & Ernestus (2006) who state that /s/ is somewhat shorter if it is followed by /t/. This in turn means that /t/ is indeed more often completely deleted instead of being reduced (in which case there would be some signs in the recordings).

Research on storage of variation has been a central issue of debate as well. At first, there were two accounts that existed regarding perception and recognition of reduced word forms when focusing on storage of these forms in the mental lexicon; the abstract representation model and the episodic model (Sumner & Samuel, 2005). The former model assumes that learners store one basic or canonical form of a word, while the latter model predicts that the representations of the words are stored with great phonetic detail which leads to many stored word forms. More recently, however, there is a general consensus about a new model: this model is a hybrid one that states that both episodic and abstract information can co-exist within the mental lexicon of the speaker (Goldinger, 2007; Demange & Van Compernolle, 2009; Mitterer, Chen, & Zhou, 2011)). It states that perception involves both episodic and

abstract information, the former denotes details of instances of perceived words (new or old ones) while the latter refers to the holographic representations of a word that exists in the mind of the speaker. This model is used to explain priming effects and speech variation.

The episodic model, or exemplar-based model, cannot explain the lack of differences in reaction time regarding the category *reduced words*. If the reduced word forms would have been stored, then reaction time should be approximately the same as those of the category *words.* Since this is not the case, this model is not supported by the data found in these experiments. The abstract representation model, where only the canonical form is stored, seems to be favoured over the episodic model. However, it cannot be claimed that no traces of phonetic detail are stored since people from Ede do recognise reduced word forms more often as existing words than people from Roosendaal. It seems to be true that some phonetic features are used for immediate recognition, which might lead to storage of variants but not on the lexical level. Instead, the allophonic level might contain information about speech variants as was proposed by Mitterer et al. (2008) and Sumner& Samuel (2005). Hence, the hybrid episodic/ abstract representation model is supported (Goldinger, 2007; Demange & Van Compernolle, 2009) where phonetic detail is stored at an earlier level.

Results about storage of word forms were also consistent with the data of Sumner & Samuel (2009) since they claim that information of dialectal variants of words and independent phonological representations can be stored. It is stated that these forms are stored in memory instead of being present from the start in the mental lexicon. Also, it is not mentioned that these forms are stored next to the canonical form, but that information of these forms can be used for recognition. More detailed phonetic information about dialectal aspects has been observed in previous studies, exactly what is seen in my results.

I suggest that reduced word forms are not stored in the mental lexicon of speakers and listeners of the dialect Ede because reaction times for these types of words were much higher than those of existing words. This pattern was seen in every age group, which proves that speech variants are not stored next to the canonical form. It is consistent with the findings of Sumner & Samuel (2005) since they showed that regular variants are not stored in long-term memory. Even though their research focussed on the pronunciation variants of /t/ and I on the absence of it, reduced word forms (in this case monosyllables ending in /st/ without /t/) are variants of the canonical form making them speech variants as well.

My findings also suggest that reduced words were considerably more often recognised as words by young speakers of Ede than young speakers of Roosendaal. Reaction time data showed that these reduced words had a longer reaction time than words, meaning that these words are not stored in the mental lexicon. Moreover, young speakers only hear the dialect Ede while they do not speak it. Thus, it is enough to frequently hear a dialect that reduces in order to recognise reduced words more often as existing words.

Future research can and should still be performed with regard to dialectal speech variation. More participants need to be tested in order to obtain even stronger results regarding the recognition of reduced word forms between dialects. Moreover, much has still to be understood about the mechanisms of storage of phonetic detail in the mental lexicon of the

speaker and how this differs with speakers and listeners of a particular dialect. In the end, dialect has proven to be largely influential with regard to /st/-cluster reduction and t-deletion while storage of reduced word forms has proven to be more intricate and complicated than first expected.

Acknowledgments

I thank Robin Broos for comments on an earlier version of this manuscript. I would also like to thank Sanne Stipthout for bringing the dialect Ede to my attention and Thomas Jansen for his help in recording the dialect of Ede for the perception experiment.

References

Aylett, M., & Turk, A. (2006). Language redundancy predicts syllabic duration and the spectral characteristics of vocalic syllable nuclei. *Journal of the Acoustical Society of America*, *119*, 3048-3058.

Baayen, R. H., & Milin, P. (2010). Analyzing reaction times. *International Journal of Psychological Research, 3*, 12-28.

Bayley, R. (1995). Consonant cluster reduction in Tejano English. *Language Variation and Change, 6*, 303-326.

Bell, A., Jurafsky, D., Fosler-Lussier, E., Girand, C., Gregory, M., & Gildea, D. (2003). Effects of disfluencies, predictability, and utterance position on word form variation in English conversation. *Journal of the Acoustical Society of America*, *113*, 1001–1024.

Bell, A., Brenier, J., Gregory, M., Girand, C., & Jurafsky, D. (2009). Predictability effects on durations of content and function words in conversational English. *Journal of Memory and Language*, *60*, 92–111.

Boersma, P. & Weenink, D. (2014). Praat: doing phonetics by computer [Computer program]. Version 5.3.66, retrieved 9 March 2014 from http://www.praat.org/

Boersma, P. (2001). Praat, a system for doing phonetics by computer. *Glot International* 5:9/10, 341-345.

Bybee, J. (2002). Word frequency and context of use in the lexical diffusion of phonetically conditioned sound change. *Language variation and change, 14*, 261-290.

Cheng, C. (2012). Mechanism of Extreme Phonetic Reduction: Evidence from Taiwan Mandarin. Dissertation to Department of Speech, Hearing and Phonetic Sciences Division of Psychology and Language Sciences University College London (UCL).

Demange, S., & Van Compernolle, D. (2009, September). HEAR: an hybrid episodic-abstract speech recognizer. *In INTERSPEECH* (pp. 3067-3070).

Ernestus, M., Baayen, H.& Schreuder, R. (2002). The recognition of reduced word forms. *Brain and Language*, *81*, 162-173.

Fosler-Lussier, E., & Morgan, N. (1999). Effects of speaking rate and word frequency on pronunciations in convertional speech. *Speech Communication, 29*, 137-158.

Frauenfelder, U. H., Scholten, M., & Content, A. (2001). Bottom-up inhibition in lexical selection: Phonological mismatch effects in spoken word recognition. *Language and cognitive processes, 16*, 583-607.

Gahl, S. (2008). ‘‘Time’’ and ‘‘thyme’’ are not homophones: Word durations in spontaneous speech. *Language*, *84*, 474–496.

Gahl, S., Yao, Y. & Johnson, K. (2012). Why reduce? Phonological neighborhood density and phonetic reduction in spontaneous speech. *Journal of Memory and Language, 66*, 789-806.

Gaskell, M. G., & Marslen-Wilson, W. D. (1996). Phonological variation and inference in lexical access. *Journal of Experimental Psychology: Human perception and performance, 22*, 144.

Giegerich, H. J. (1992). *English phonology: An introduction*. Cambridge University Press.

Goeman, T. (1999). T-deletie in Nederlandse dialecten : kwantitatieve analyse van structurele, ruimtelijke en temporele variatie. Dissertation.

Goldinger, S. D. (2007). A complementary-systems approach to abstract and episodic speech perception. *In Proceedings of the 16th international congress of phonetic sciences* (pp. 49-54).

Gow, D. W. (2002). Does English coronal place assimilation create lexical ambiguity. *Journal of Experimental Psychology: Human Perception and Performance, 28*, 163–179.

Gow Jr, D. W., & Im, A. M. (2004). A cross-linguistic examination of assimilation context effects. *Journal of Memory and Language, 51*, 279-296.

Johnson, K. (2004). Massive reduction in conversational American English. In *Spontaneous speech: Data and analysis. Proceedings of the 1st session of the 10th international symposium* (pp. 29-54). Tokyo, Japan: The National International Institute for Japanese Language.

Jurafsky, D., Bell, A., Gregory, M., & Raymond, W. D. (2001). Probabilistic relations between words: Evidence from reduction in lexical production. *Typological studies in language*, *45*, 229-254.

Mitterer, H., & Blomert, L. (2003). Coping with phonological assimilation in speech perception: Evidence for early compensation. *Perception & Psychophysics, 65*, 956-969.

Mitterer, H., Csépe, V., Honbolygo, F., & Blomert, L. (2006). The recognition of phonologically assimilated words does not depend on specific language experience. *Cognitive Science, 30*, 451-479.

Mitterer, H., & Ernestus, M. (2006). Listeners recover /t/s that speakers reduce: Evidence from /t/-lenition in Dutch. *Journal of Phonetics, 34*, 73-103.

Mitterer, H., Yoneyama, K., & Ernestus, M. (2008). How we hear what is hardly there: Mechanisms underlying compensation for /t/-reduction in speech comprehension. *Journal of Memory and Language, 59*, 133-152.

Mitterer, H., Chen, Y., & Zhou, X. (2011). Phonological Abstraction in Processing Lexical-Tone Variation: Evidence From a Learning Paradigm. *Cognitive Science, 35*, 184-197.con

Plug, L. (2011). Phonetic reduction and informational redundancy in self-initiated self-repair in Dutch. *Journal of Phonetics, 39*, 289-297.

Pluymaekers, M., Ernestus, M., & Baayen, R. H. (2005). Lexical frequency and acoustic reduction in spoken Dutch. *The Journal of the Acoustical Society of America, 118*, 2561-2569.

Raymond, W. D., Dautricourt, R., & Hume, E. (2006). Word-internal/t, d/deletion in spontaneous speech: Modeling the effects of extra-linguistic, lexical, and phonological factors. *Language Variation and Change, 18*, 55-97.

Recasens, D. (2004). The effect of syllable position on consonant reduction (evidence from Catalan consonant clusters). *Journal of Phonetics, 32*, 435-453.

Savin, H. B. (2005). Word-Frequency Effect and Errors in the Perception of Speech. *The Journal of the Acoustical Society of America, 35*, 200-206.

Scheibman, J. (2000). < i> I dunno</i>: A usage-based account of the phonological reduction of< i> don't</i> in American English conversation. *Journal of Pragmatics, 32*, 105-124.

Schouten, M. (1982). 'T-Deletie in de stad Utrecht: Schoolkinderen en grootouders.' *Forum der Letteren, 23*, 282-291.

Schouten, M. (1984). 'T-Deletie in het zuiden van de provincie Utrecht.' *Taal en Tongval, 36*, 162-173.

Strange, W., Akahane-Yamada, R., Kubo, R., Trent, S. A., & Nishi, K. (2001). Effects of consonantal context on perceptual assimilation of American English vowels by Japanese listeners. *The Journal of the Acoustical Society of America, 109*, 1691-1704.

Sumner, M., & Samuel, A. G. (2005). Perception and representation of regular variation: The case of final/t. *Journal of Memory and Language, 52*, 322-338.

Sumner, M., & Samuel, A. G. (2009). The role of experience in the processing of cross-dialectal variation. *Journal of Memory and Language, 60*, 487-501.

Van Bergem, D. R. (1993). Acoustic vowel reduction as a function of sentence accent, word stress, and word class. *Speech Communication, 12*, 1-23.

Van Son, R.J.J.H. (1999). An acoustic description of consonant reduction. *Speech Communication, 28*, 125-140.

Vries, J. de et al. (1974). De slot-t in consonantclusters te Leiden: een sociolinguistisch onderzoek. *Forum der Letteren, 15*, 235-250.

Appendix

Stimuli Experiment 1

1.	Nest	Mat
	Herfstblad	Huis
	Misthoorn	Huissleutel
	Pesthumeur	Voetbal
	Putdeksel	Korst
	Mus	
2.	Kat	Boothuis
	Testbeeld	Vorst
	Kwast	Muis
	Lat	Vorstperiode
	Fietszadel	Vis
	Mist	
3.	Flatgebouw	Pot
	Roos	Angsthaas
	Borst	Schetsboek
	Schaatsbaan	Kast
	Rijst	Hut
4.	Kus	Pretpark
	Rustplaats	Kunst
	Kerst	Kerstkrans
	Worst	Barst
	Mes	Dienstauto
5.	IJs	Luchtballon
	Kerstmarkt	Postzegel
	Angst	Bot
	Kruistocht	Winstmarge
	Vangst	Paskamer
6.	Hoeslaken	Pest
	Postcode	Borstbeeld
	Westkust	Lijst
	Hengst	Voet
	Kunstgalerij	Vuist

7. Bluswater
   Hartaandoening
   Roestbak
   Herfst
   Post
   Fruitschaal
   Herststorm
   Kustlijn
   Roet
   Hoestdrank

Verhaal 1:

“Op de weg naar buiten struikelde ik bijna over een voetbal die op de mat lag. Ik besloot om te voet naar huis te gaan en alvast mijn huissleutel te pakken. Ik keek naar boven en zag een nest van een mus bovenin een boom waar een herfstblad uitstak. Opeens hoorde ik de claxon van een auto die net zo luid leek te zijn als een misthoorn. Door het kabaal en een losliggend putdeksel viel ik deze keer wel op de grond. Daar komt een grote korst op, dacht ik bij mezelf. Mijn pesthumeur verdween echter snel toen de zon weer tevoorschijn kwam.”

Verhaal 2:

“Terwijl ik de kwast en het fietszadel terug naar de schuur bracht, werd er verteld op de tv dat er vorst op komst was samen met een lange vorstperiode en dat vandaag dikke mist op zou komen zetten. Ik zag dat er een lat los lag vlak bij de tv. Toen ik echter dichterbij kwam, zag ik plotseling alleen nog maar ruis op tv en daarna testbeeld. Het ding was zo weer gemaakt en er verscheen een nieuwsitem met vis in een boothuis. Eenmaal buiten zag ik dat de kat een muis had gevangen.”

Vehaal 3:

“Achter een raam van een flatgebouw stond een mooie pot op de venterbank waar een roos in groeide. Naast de flat stond een hut achter een nabijgelegen schaatsbaan. Er kwam een vrouw uit de schaatsbaan; ze pakte iets uit de kast en kwam naar buiten met een soort schetsboek in haar handen. Ze liep met haar borst vooruit en was duidelijk geen angsthaas. De vrouw was in gesprek met een jongen op een scooter die iets zei over een bestelling met rijst. Aan het einde van het gesprek betaalde ze de man en ging naar binnen om wat rijst te eten.”

Verhaal 4:

“Het was kerst bij mijn tante en er hing een grote kerstkrans aan de deur. Ik had liever naar een pretpark gegaan, maar ik moest voldoen aan mijn sociale verplichtingen. Aan de muur hing een vreemd schilderij van een dienstauto die een barst had op de voorruit. Noemen ze dat kunst tegenwoordig, dacht ik bij mezelf. Moeder gaf een kus aan de kinderen en zei dat ze de worst braaf met mes en vork moesten eten. De baby lag in haar wieg, wat mijn oma ook wel de ‘rustplaats van het kleintje’ noemde.”

Verhaal 5:

“We waren eindelijk op de kerstmarkt in Utrecht. Er waren allerlei kraampjes die versierd waren met sneeuw en ijs, waarvan één een middeleeuws thema had; er lag een schilderij met daarop soldaten die zonder angst op een kruistocht gingen. Pa kocht bij een viskraam de

vangst van de dag en ma stond in een paskamer een truitje te passen. Ze was nogal van streek omdat de verkoopster zo onaardig was (wat waarschijnlijk kwam door de lage winstmarge). Ikzelf kocht een bot voor de hond en een postzegel met daarop een luchtballon omdat dat in ieder geval nog leuk was."

Verhaal 6:

"In de kunstgallerij aan de westkust van Duitsland hing een portret met een saaie lijst van een borstbeeld dat aangetast was door roest met daarnaast een standbeeld van een hengst. Ik ging zitten op een bankje en pakte mijn pen en begon met het schrijven van een brief. Deze zou ik later posten naar mijn broer maar zijn postcode was ik helaas vergeten. Ik heb er de pest in dat ik naar die stomme gallerij moet. Het liefst zou ik in mijn bed liggen met een lekker zacht hoeslaken om op te slapen. Daaraan denkende stootte ik mijn voet en balde mijn vuist."

Verhaal 7:

"Terwijl ik buiten de herststorm trotseerde om de post te pakken, besloot mijn vader om het bluswater op te ruimen. Hij had zijn roestbak van een auto per ongeluk in brand gezet en nu zat alles onder het roet. Was ik maar in een plaatsje dat lag op de kustlijn waar ik languit op een bed op het strand zou gaan liggen. In plaats daarvan moest ik hoestdrank innemen omdat ik zo hard moest hoesten van de rook die vrij was gekomen tijdens de brand. Om alles nog erger te maken, moesten we op bezoek bij mijn oma die een hartaandoening had. Het was traditie om de eerste dag van de herfst koffie te komen drinken, maar de koekjes zijn altijd smerig. Ik besloot dus maar een appel van de fruitschaal te eten."

<u>Stimuli Experiment 2</u>

1. Horst met
   Lamp in
   Mast beweegt
   Tas onder
   Post dankzij
   Angst vanwege
   Muur staat
   Kerst sinds
   Stekker op
   Kaars aan
   Dorst van

2. Zest van
   Paard rent
   Fust bier
   Hek over
   Garst naast
   Lijst tussen
   Toets op

Vuist slaat
Lucht in
Boot vaart
Gerst kweekt

3. Haast maken
   Vloer legt
   Beest vanwege
   La hangst
   Herfst zo
   Vangst min
   Raam staat
   Blad zweeft
   Hoest voorbij
   Sjaal waait
   Winst volgens

4. Hulst tegen
   Brood kruimelt
   Karst kalk
   Wolk geeft
   Borst van
   Muist piept
   Kist vol
   Bloem ruikt
   Best boven
   Gast met
   Doek om

5. List door
   Kunst rond
   Luik schijnt
   Barst boven
   Kwast tegen
   Gunst vragen
   Ernst zien
   Host daar
   Draad spant
   Feest voorbij
   Mat ligt

6. Last van
   Roos bloeit
   Naald op

Korst zonder
Lust pudding
Doos staat
Hengst schopt
Mist buiten
Pijp ligt
Noest werk
Bak vult

7. Oost richting
   Kroost zwanen
   Pest met
   Schaar is
   Bal rolt
   Leest beneden
   Weg rijdt
   Dienst tot
   Krent rolt
   Puist bij
8. Kleur zal
   Gierst plukken
   Kast naast
   Stof vliegt
   Rest neemt
   Pijl wijst
   Oogst kwetst
   Komst vieren
   Rust rondom
   Knoest tegenover
   Bed aan

9. Tekst leest
   Dak gaat
   Gist brouwen
   Thee trekt
   Mest strooien
   Test plus
   Stroom geeft
   Vest zonder
   Knop druk
   Roest wegens
   Schrift onder

10. Vondst moest

Touw aan
Kust door
Vorst tijdens
Pluis op
Nest bij
West via
Zon in
Rijst tegenover
Schoen over
Worst vanaf